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ABSTRACT

Presented is an elementary school science program designed to offer a basic continuum of process objectives and concepts. A brief history of the development of the Wappingers Central School District's Elementary Science Committee is presented to help lay the groundwork for the redesigning of the science program described. Potential advantages hoped to be accrued are listed and goals are presented. The scope and sequence of the program is described in both narrative and schematic form. Each major concept is presented and objects for each grade level, K through six, are included. Experiences relating to the scope and sequence of the program are related to New York State Guides--"Science for Children." (Author/EB)

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ELEMENTARY DEPARTMENT

WAPPINGERS CENTRAL SCHOOL DISTRICT
WAPPINGERS FALLS, NEW YORK

ELEMENTARY SCIENCE PROGRAM

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JANUARY, 1975

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PREFACE

The Elementary Science Program has been developed in full realization of the moral of this fable.

Once upon a time a Sea Horse gathered up his seven pieces of eight and cantered out to find his fortune. Before he had traveled very far he met an Eel, who said,

"Psst. Hey bud. Where'ya goin'?"

"I'm going out to find my fortune," replied the Sea Horse, proudly.

"You're in luck," said the Eel. "For four pieces of eight you can have this speedy flipper, and then you'll be able to get there a lot faster."

"Gee, that's swell," said the Sea Horse, and paid the money and put on the flipper and slithered off at twice the speed. Soon he came upon a Sponge, who said,

"Psst. Hey, bud. Where 'ya goin'?"

"I'm going out to find my fortune," replied the Sea Horse.

"You're in luck," said the Sponge. "For a small fee I will let you have this jet-propelled scooter so that you will be able to travel a lot faster."

So the Sea Horse bought the scooter with his remaining money and went zooming through the sea five times as fast. Soon he came upon a Shark, who said,

"Psst. Hey, bud. Where 'ya goin'?"

"I'm going out to find my fortune," replied the Sea Horse.

"You're in luck. If you'll take this short cut," said the Shark, pointing to his open mouth, "you'll save yourself a lot of time."

"Gee, Thanks," said the Sea Horse, and zoomed off into the interior of the Shark, there to be devoured.

The moral of this fable is that if you're not sure where you're going, you're liable to end up someplace else-and not even know it.

FOREWARD

Children's understanding of their environment is essential to their effective interaction with it. Having the fundamental knowledge of both the processes and concepts of Science, each child will be better able to understand, investigate, and develop our world to the benefit of all organisms involved.

With this in mind, the District Science Committee has developed a program which is designed to offer a basic continuum of process objectives and concepts to the children of our Elementary Schools.

As the program developed, we have been fortunate to have had outstanding contributions and invaluable criticisms of many people on our teaching and administrative staff, as well as assistance from the State Education Department and other Science educators outside of our District.

A special note of appreciation and commendation goes to the people on the District Science Committee who have given their expertise and efforts to this project.

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C. Tuttle
P. Waldman

A note of appreciation goes to Elaine Busing for the design on the front cover.

We trust that it will be effective and provide the key to the Elementary Science Program - the key being to "create and maintain" interest.

Michael W. Pombrio,
Elementary Department Head

BRIEF HISTORY

A brief history will help lay the groundwork as it relates to the development of the District's Elementary Science Committee.

On the December 4, 1972 Superintendent's Conference Day, a workshop in Science was held with personnel present representing K-12. The primary emphasis of the workshop related to the functioning of the Elementary Science Program. As a result of that workshop specific problem areas were outlined and suggestions made for further study.

Beginning in January, 1973, the Elementary Schools began to develop an approach to "revitalize" science teaching.

It was decided to pilot textbook-based programs in each school - with one teacher at each grade level (1-6) within that building to utilize the pilot program beginning in September 1973.

The staff at each building during the Spring semester of 1973 began to gather information on various programs. By May each building had made the selection of the program to be utilized.

Subsequently the District's Elementary Science Committee was formed. This committee was charged with basically four responsibilities which were:

1. To develop a list of science materials which would be basic to any program and therefore should be part of a constant inventory within each elementary building.

2. To evaluate the pilot science programs.

3. To develop a science program for grades K-6.

4. To suggest methods of implementation for the Science Program which is developed.

With these charges as guidelines, the District's Elementary Science Committee began to function in the Fall of 1973, resulting in the program which has been developed.

INTRODUCTION

There are many roads to both excellence and innovation. With this in mind the Wappingers Central School District's Elementary Science Committee began its task of redesigning the Science Program in the Elementary Schools of our District.

The first step taken by the committee was to agree upon the philosophy which would be basic to our Science Program. To do so the committee members explored not only their own philosophies but those of their colleagues in the individual buildings. The resulting conclusion of this search was that the underlying philosophy has been predominantly content - oriented in our District.

After investigating the work of the National Science Foundation in the early 60's, it has been found that Science educators began to support the concept of a process or inquiry approach toward the teaching of Science - a philosophy which states that children should be actively involved in various types of learning situations so they might develop skills such as observing, measuring, classifying, predicting, controlling variables and interpreting results.

With all of the past practices and present research taken into account, the committee determined how the needs of the children in our District can be met. As a result the following statement has been developed as the philosophical approach to be taken in the Elementary Schools of the Wappingers Central School District.

While we are developing facts, concepts and principles, we are also stressing the processes of Science teaching. To do so, it is imperative that our students be exposed to concrete manipulation of materials, printed matter and demonstrations. In this way we will be integrating the processes of Science as well as the basic understandings and concepts necessary to permit our children to attack new problems.

As the student progresses, various processes will become more evident. Some of the processes we should constantly strive to infuse into our Science teaching should be those of:

Experiencing	(observing, sensing, investigating)
Identifying	(describing, both quantitative and qualitative aspects)
Classifying	(grouping, matching, comparing)
Measuring	(estimating, calculating)
Hypothesizing	(predicting, generalizing)
Interpreting	(analyzing)
Communicating	(constructing, demonstrating, describing, questioning, reading, discussing)
Designing Investigations	(controlling variables, recording and interpreting data)

With these processes in mind, the students should have frequent opportunities to explore with varied materials, develop hypotheses and investigations, and analyze their findings as well as to verify previous learnings. Active involvement with materials must be the prime mode of instruction throughout our program.

To activate these processes, a question and/or a series of questions will give purpose and direction for the learnings of children. Questions of the following nature can open new areas of knowledge:

"What do you think will happen if..."
"Why do you think that happened?"
"How can we find out?"
"In how many ways can we..."
"What can you conclude from your data?"

By our questioning, and not always giving the answers, a child will be provided with experiences, ideas and discoveries. In this way Science is approached as it really is - an active, on-going process.

As children learn to utilize these processes, they will become more independent and self-directive in their learning. In rediscovering what others before them have discovered, they will learn not only a body of verified knowledge about their world, but methods of obtaining of new knowledge.

In the committee's judgement, there are definite advantages which will be evident upon the introduction and implementation of an "inquiry" science curricula. The "inquiry" approach offers firsthand, investigative experiences which will provide the vehicle and the subject matter which leads to active classrooms with interaction being the principal mode and the "read, demonstrate, and lecture" methods becoming the supportive systems.

POTENTIAL ADVANTAGES TO BE ACCRUED:

1. The "inquiry" approach will allow teachers to become more responsive to a wider range of pupil differences.
2. Through personal involvement, students' and teachers' liking for and knowledge of science concepts and techniques should increase.
3. Being actively involved in scientific procedures should encourage independent learnings, and supplemental reading and research should develop as an outgrowth.
4. An active "inquiry" type science program should lead to greater community involvement.
5. By offering programs that allow individual participation, our schools will help offset the traditional view that girls cannot perform investigative activities as well as boys. An atmosphere that allows for very positive attitudes toward science among both boys and girls will be further developed through the "inquiry" approach.

In this manner the Elementary pupils of the Wappingers Central School District can truly begin to develop a real appreciation for the role that Science plays in their lives.

GOALS

If the key to our Elementary Science Program is to "create and maintain" interest, then it is imperative that all concerned are aware of the basic goals which we are striving to obtain.
These Goals are:

TO PROVIDE EXPERIENCES SO THAT A CHILD MAY DEVELOP AN UNDERSTANDING OF THE INTERDEPENDENCE OF LIVING THINGS

TO PROVIDE FOR THE OBSERVATION & INVESTIGATION OF OUR EVERYDAY ENVIRONMENT

DEVELOP INVESTIGATIONS LEADING TO AN UNDERSTANDING OF SCIENTIFIC CONCEPTS THROUGH OESERVATION, EXPERIMENTATION, AND MANIPULATION

TO INVESTIGATE THE REASONS FOR AND POSSIBLE METHODS OF CONSERVING OUR NATURAL RESOURCES

TO DEVELOP, THROUGH INVOLVEMENT, THE APPRECIATION AND UNDERSTANDING OF THE BEAUTY, COMPLEXITY, AND ORDERLINESS OF NATURE

SCOPE AND SEQUENCE

THE ELEMENTARY SCIENCE PROGRAM provides for a curriculum which delineates the scope of the material to be presented and also the sequential pattern that the presentation of this material should follow.

The Scope and Sequence pattern has been developed so that there would be as little overlap of content areas as possible as a child progresses from one year to the next. It indicates a minimum amount of content to be covered so that each child in grades K - 6 will be exposed to a common framework of conceptual schemes.

The teacher is also provided with freedom to utilize his/her individual resources to delve into other conceptual areas, systems, processes and/or activities.

The conceptual area within this curriculum have been developed through the use of process objectives. This has been done to assist the professional in planning for instruction (grouping, materials, and teaching strategies) and in evaluating student growth. It helps the students by making them aware of what is to be accomplished.

Throughout the Science program as the processes and conceptual schemes are developed, THE STUDENT SHOULD CONSTANTLY BE MADE AWARE OF THE RELATIONSHIP OF THE AREA(S) BEING INVESTIGATED AS IT AFFECTS HIS/HER DAILY LIFE. In this way Science will provide a vehicle for children to understand the interrelationships involved in their world.

WAPPINGERS CENTRAL SCHOOL DISTRICT

Elementary Science Program

SCOPE and SEQUENCE

	Environment	Matter and Energy	Earth and Atmosphere	Homo Sapiens	Universe	Living Things
KINDERGARTEN	Survival ↕ Inter-Dependence	AWARENESS LEVEL (DEVELOPED THROUGH INVESTIGATION UTILIZING THE SENSES)				
GRADE 1	↕ Scarcity	Simple Machines — Forces	Weather (Observational) — Properties Of Air	Balanced Diet and Growth — Food Groups	Seasons — Relationships (Sun, Moon, and Earth)	Animals (Basic Needs, Movement) — Growth and Parts of Plants
GRADE 2	↕ Recyclement	Solids, Liquids, and Gases — Magnetism	Nature of Water — Water Cycle — Types of Soil	Dental Health — Five Senses	Revolution and Rotation	Animals (Classification, Characteristics, Obtaining Food)
GRADE 3	↕ Rights vs Responsibility	Simple Electricity	Earth (Composition and Change)	Introduction To Body Systems — Safety Accident Prevention	Introduction To The Solar System and Constellations	Interdependence of Living Things — Adaptation To Environment
GRADE 4	↕ Planning	Simple Machines — Molecules (Solids, Liquids and Gases)	Weather	Digestive and Circulatory Systems — Basic Food Groups — Tobacco	Moon — Man in Space	Insects — Pollination — Parts of Flowers and Seeds
GRADE 5	↕ Valuing	Electricity — Electro-Magnetism — Atomic Structure	Formation and Forces of The Earth	Respiratory, Excretory, Musculoskeletal Systems — Alcohol	Solar System	Photosynthesis — Classification of Plants
GRADE 6	↕ Social Forces ↕ Optimism	Changes in Matter — Forms of Energy — Wave Theory	Oceanography — Minerals	Nervous System — Drugs	Beyond The Solar System — Theories of Formation and Change	Eras of Life — Classification of Animals — Behavior of Plants & Animals — Plant & Animal Cells

A) ENVIRONMENTAL STUDY

Environmental education should be an integral part of life's curriculum. The elementary schools of the Wappingers Central School District will undertake part of the responsibility for developing an awareness of and a responibility for our environment.

At all grade levels each environmental theme should be developed as it relates to both the content matter and interest level of children. Each child should be involved in various group activities developed specifically to enhance both their understanding and appreciation of our environment.

This can be accomplished through the integration of the themes directly into the various strands and/or dealing with the environmental theme as a separate entity.

During the elementary years the child will be exposed to a variety of experiences within the following themes that will contribute to their understanding of the environment and an appreciation of its beauty and value.

SURVIVAL-CONTINUING LIFE (OR EXISTENCE) IN THE PRESENCE OF DIFFICULT CONDITIONS... SURVIVAL DEPENDS UPON THE ABILITY OF AN ORGANISM TO ADJUST TO ITS ENVIRONMENT.

The basic function of any ecosystem is to capture and transfer energy.

Diversity is a key factor in the survival of an ecosystem.

Physical well-being is a fundamental necessity for survival even though man often places a higher value on other things.

Man changes the natural environment to the extent that many species find it difficult to adapt to the new conditions.

INTERDEPENDENCE-MUTUAL RELIANCE... AN ORGANISM CANNOT LIVE ALONE

Living things are interdependent with one another and with their environment.

Natural resources are unequally distributed with respect to land areas and political boundaries, and the use or misuse of them affects others.

The energy requirements of man are met primarily by "food", and men are dependent upon other organisms through food chains and food webs.

SCARCITY-SMALLNESS OF QUANTITY IN RELATION TO NEEDS... AS POPULATIONS INCREASE, COMPETITION FOR RESOURCES NECESSITATES THE ESTABLISHMENT OF PRIORITIES

An understanding of scarcity is necessary to our understanding of the environment.

Some parts of the natural environment are either difficult to replace or are, in fact, irreplaceable.

Natural resources, in terms of both quantity and quality, are important to all living things. As population increases, competition for use of these resources increases, resulting in a need for establishing priorities.

RECYCLEMENT-CONTINOUS FEEDBACK FOR REUSE...MAN WOULD DO WELL TO OBSERVE NATURE'S EXAMPLE AND REUSE THE RESULTS OF THIS TECHNOLOGY

A) ENVIRONMENTAL STUDY

In nature, there is a continuous recycling of many elements.

Man would do well to observe nature's example and recycle the results of his technology.

RIGHTS vs. RESPONSIBILITY-SATISFYING THE REQUIREMENTS OF SUITABILITY OR CONVENIENCE VS. ACCOUNTABILITY...MAN HAS EXERCISED HIS RIGHT WITH LITTLE REGARD FOR HIS RESPONSIBILITY TO THE ENVIRONMENT

Man has exercised a presumed right to exploit the environment with little regard for his responsibility to preserve or share it.

It is the responsibility of each individual to become aware of existing governmental regulations intended to protect the environment.

. PLANNING-DETAILING A PROGRAM OF ACTION...DECISIONS CONCERNING THE FUTURE MUST BE BASED ON LONG-TERM ENVIRONMENTAL BENEFITS

Decisions concerning the future must be based on long-term environmental benefits.

Man alters the options available to future generations when he unwisely manipulates the natural environment.

Environmental quality must be maintained as population increases and the available space per individual decreases.

Man's efforts at changing the environment to fulfill his needs are often beneficial to him but harmful to the environment.

. VALUING-ASSESSING RELATIVE WORTH OR IMPORTANCE...MAN IS ENDANGERING HIS CHANCES FOR A BETTER LIFE THROUGH THE VERY MEASURES HE EMPLOYS TO ACHIEVE IT

Man currently faces the prospect of endangering his chances of a better life through the very measures he employs to achieve it.

Individuals (and because of them, industry) tend to select short-term economic gains, often at the expense of greater long-term environmental benefits.

Art can be an expression of an individual's feelings about his natural surroundings.

I. SOCIAL FORCES-AGENTS OF CHANGE IN SOCIETY...SOCIETY MUST BE MOVED TO INSURE THE PRESERVATION OF THE ENVIRONMENT

In order to preserve our threatened environment present attitudes must change to reflect a widespread public concern which will encourage protective action by individuals, groups, and government.

. OPTIMISM-ANTICIPATING THE BEST POSSIBLE OUTCOME...MAN HAS THE CAPACITY TO MAKE THIS THE BEST OF ALL POSSIBLE WORLDS

Man has the ability to make this the best of all possible worlds.

The arts seem to aid man in feeling a oneness with nature and with fellow men.

Opportunities have been provided for man to experience and enjoy nature.

Although much needs to be done to improve and preserve our environment, we must stop occasionally and acknowledge the gains that are being made in these directions.

B) MATTER AND ENERGY

KINDERGARTEN

a)The student will investigate and gain sensory images of various aspects of the "Matter and Energy" strand which will be further developed in subsequent grades.

GRADE I

a)The student will observe, investigate and describe the properties of simple machines.

b)The student will recognize which type of simple machine - inclined plane, wedge, lever, pulley, screw or wheel - is used in a given situation, both at home and at school.

c)The student will observe, investigate, and demonstrate how things move (push, pull, gravity).

GRADE II

a)The student will observe, investigate and describe the characteristics of magnets and magnetic force.

b)The student will be exposed to different kinds of magnets that can be used in numerous ways.

c)The student will investigate the materials in his/her environment to determine the properties of a solid, liqyid and gas.

d)The student will identify and classify materials in his/her environment according to the properties they have dicovered through their investigation.

e)The student will observe, investigate and describe physical and chemical changes in the three forms of matter.

GRADE III

a)The student will observe, investigate and demonstrate that electricity produces heat, light, sound, and motion.

b)The student will observe, investigate and describe the possible hazards which might occur when using elctricity and note the precautions to be taken to prevent those hazards.

B) MATTER AND ENERGY

GRADE IV

a)The student will demonstrate and classify the behavior of the molecules in a solid, liquid and gas.

b)The student will observe, investigate and describe the physical changes in the state of matter caused by heating, cooling, and/or air pressure.

c)The student will observe and investigate how simple machines (lever, single pulley, wheel and axle, inclined plane, wedge and screw) perform work.

d)The student will construct and demonstrate simple machines.

e)The student will identify and demonstrate methods of reducing friction.

GRADE V

a)The student will observe, construct, and demonstrate the components (switch, battery, bulbs and wire) of a simple circuit.

b)The student will investigate, construct and describe a simple electromagnet.

c)The student will observe, investigate and describe the possible hazards which might occur when using electricity and note the precautions to be taken to prevent those hazards.

d)The student will identify, construct and describe the structure of an atom, including electron, protons, neutrons, electron orbits and nucleus.

GRADE VI

a)The student will observe, investigate, distinguish and describe the changes in matter (physical and chemical).

b)The student will explain what form of energy (mechanical, chemical, heat, light, sound, electrical) and/or what state of energy (kinetic or potential different objects have, use or produce that make it possible for them to do work.

c)The student will investigate and distinguish between water, light and sound waves in terms of their behaviors and properties and how they interact with matter and their uses (radio, telephone, lens, television).

C) EARTH AND ATMOSPHERE

KINDERGARTEN

a)The student will investigate and gain sensory images of various aspects of the "Earth and Atmosphere" strand which will be further developed in subsequent grades.

GRADE I

a) The student will observe the changes in weather patterns.

b)The student will observe and record temperature changes over a given period of time.

c)The student will observe the appearance and movement of clouds.

d)The student will observe the various forms of precipitation.

e)The student will experience the use of simple weather instruments such as a thermometer, wind vane, etc.

f)The student will predict weather based on previous observations.

g)The student will be made aware of the properties of air and the effects of weather changes in his/her daily life.

GRADE II

a)The student will observe and discuss the properties of and the importance of water to man and the environment.

b)The student will observe, investigate, and describe the process of the water cycle (evaporation and condensation).

c)The student will measure and record the amount of precipitation over a given period of time.

d)The student will observe and identify the composition of the different types of soil in his/her environment.

e)The student will observe and investigate the effects of the different types of soil on plant growth.

f)The student will investigate and describe various methods of improving the quality of soil (earthworms, composting, fertilizer, etc.).

GRADE III

a)The student will observe, investigate, identify and classify ways in which the surface of the earth changes (i.e. water, heat, ice, volcanoes, wind, plants) and how this affects man's environment.

b)The student will distinguish between rock and other hard non-living things.

c)The student will observe, describe and classify rocks according to their properties (i.e. size, shape, color, texture).

C) EARTH AND ATMOSPHERE

d)The student will investigate the formation of fossils.

GRADE IV

a)The student will observe, investigate and demonstrate the process of the water cycle.

b)The student will identify types of precipitation.

c)The student will observe, measure, record and forecast weather conditions over a given period of time.

d)The student will observe, identify and demonstrate the uses of instruments relating to weather.

e)The student will observe and identify and interpret causes of climatic differences in the regions of the earth: (polar, tropic and temperate zones).

GRADE V

a)The student will investigate and display an understanding of various theories of the earth's formation as well as developing other possible theories.

b)The student will investigate and describe the composition of the earth.

c)The student will observe, analyze and describe how and why changes occur in the features of the earth (change agents include: wind, water volcanoes, meteorites, glaciers, folding and faulting, landslides and waves).

GRADE VI

a)The student will observe, investigate and describe the physical properties and the behavior of the oceans (temperature, density, elements, minerals, topography, currents, and organisms).

b)The student will investigate and describe the interrelationship of life within the oceans and with other living things.

c)The student will observe, describe and classify rocks and minerals according to their properties (i.e. size, shape, color, texture).

D) HOMO SAPIENS

The areas listed on the scope and sequence chart and developed to a greater extent within the process objectives relate to areas to be stressed at these grade levels.

To have a sound program of health education, it is also important that appropriate learning experiences be provided for each child at his/her level of development as suggested in the Health-Science Curriculum.
The areas to be developed at each grade level are:

Physical Health. . .
Mental Health. . .
Environmental Health - Prevention and Control of Disease. . .
Community, National and World Health. . .
Safety Education. . .

In this way learning experiences will take place in a continuous and sequential program to provide for the best possible social, emotional, intellectual and physical growth of our children.

KINDERGARTEN

a)The student will investigate and gain sensory images of various aspects of the "Homo Sapiens" strand which will be further developed in subsequent grades.

GRADE I

a)The student will become aware of the concept of a balanced diet in relation to his/her physical and mental development.

b)The student will classify foods into the four basic food groups (milk, meat, bread-cereal, vegetable-fruit).

GRADE II

a)The student will observe and describe the functions of the primary teeth in eating, speaking and the preparation for the permanent teeth.

b)The student will observe and describe the functions of the different types of permanent teeth (cutting, chopping, tearing, crushing, grinding).

c)The student will identify factors leading to tooth decay and possible methods of prevention.

d)The student will observe and describe proper dental hygiene through an awareness of brushing techniques, balanced diets, and regular dental checkups.

e)The student will observe, investigate and classify objects within their environment as they relate to each of the five senses.

f)The student will observe and discuss the functions of the organs related to seeing, hearing, tasting, touching, and smelling.

g)The student will observe and describe the simple parts of the eye and the ear.

D) HOMO SAPIENS

GRADE III

a)The student will identify and describe the basic parts and functions of the systems of the body (i.e. digestive, circulatory, respiratory, nervous, musculoskeletal, excretory).

b)The student will investigate and describe the precautions that one would take to insure safe living.

GRADE IV

a)The student will identify and describe the digestive processes that occur in the mouth, esophagus, stomach, small intestine and large intestine.

b)The student will demonstrate knowledge of the circulatory system by identifying the parts of the human circulatory system and describe the function of each of the following - heart, capillaries, arteries, veins.

c)The student will identify and describe the major parts of the blood.

d)The student will classify familiar foods as belonging to one of the following: 1-milk group; 2-meat group; 3-bread-cereal group; or 4-vegetable-fruit group.

e)The student will identify the best sources of each of the following nutrients: carbohydrates, fat, and protein.

f)The student will plan well-balanced diets.

g)The student will recognize symptoms that describe the physiological effects of smoking on the human body.

D) HOMO SAPIENS

GRADE V

a)The student will identify various parts of the human respiratory system (lungs, nose, nasal passage, windpipe, epiglottis, larynx, trachea, bronchus, air sacs, diaphragm) and describe the function of each.

b)The student will describe the structure and functions of the muscular system as it relates to the skeletal system.

c)The student will locate and identify the major bone areas that form the framework of the body, including such areas as the skull, rib cage, backbone, pelvis, leg and arm, toe and finger, kneecap, etc.

d)The student will locate and describe the various types of joints of the body.

e)The student will identify and describe the functions of the various segments of the excretory system, including kidneys, bladder, and sweat glands.

f)The student will recognize symptoms that describe the physiological effects of alcohol on the human body.

g)The student will identify the path alcohol takes as it is absorbed into the blood stream and identify three principal parts of the body that are adversely affected.

GRADE VI

a)The student will identify and describe the location, structure and functions of the major parts of the central nervous system, (brain, spinal cord, nerve cells and the organs of the five senses).

b)The student will recognize and discuss symptoms that describe the physiological effects of the specific drugs on the human body.

c)The student will identify and discuss proper and improper uses of drugs.

E) UNIVERSE

KINDERGARTEN

a)The student will investigate and gain sensory images of various aspects of the "Universe" strand which will be further developed in subsequent grades.

GRADE I

a) The student will observe, investigate and describe the major features of the seasons (temperature, precipitation, length of day).

b)The student will interpret how the changes of the seasons affects man, animals, and plants within their environment.

c)The student will observe and describe the stars, moon, sun, and earth as they see them in the sky.

d)The student will observe and describe the apparent movement of the moon and sun across the sky.

e)The student will be exposed to the concept that our Earth is one of many planets in the Solar System.

f)The student will understand how the sun affects our environment.

GRADE II

a)The student will be made aware of the concepts of rotation and revolution as it relates to the earth and sun.

b) The student will investigate and describe rotation and revolution as they relate to concepts of time in man's life.

c)The student will observe and investigate the earth's dependence upon our nearest star the sun.

d)The student will observe and measure the variations of shadows in relationship to the position of the sun.

E) UNIVERSE

GRADE III

a)The student will investigate and describe the members of our solar system.

b)The student will investigate and describe why the earth is favorable for life in contrast to other planets.

c)The student will observe and discuss constellations.

GRADE IV

a)The student will observe, investigate and describe the characteristics of the moon.

b)The student will analyze and demonstrate the relative motions of the moon as it relates to the earth and sun (i.e. tides, eclipses and seasons).

c)The student will investigate and describe the factors necessary to explore and inhabit space.

GRADE V

a)The student will investigate various theories of the origin of the solar system.

b)The student will investigate and describe the characteristics of the members of the solar system (sun, planets, satellites, comets and meteors).

c)The student will investigate, compare and interpret the relationship of the various bodies of the solar system using sizes, distance and velocities.

GRADE VI

a)The student will investigate various theories of the formation and change of the universe.

b)The student will investigate and describe the characteristics of the members of the universe (stars, constellations, and galaxies).

F) LIVING THINGS

KINDERGARTEN

a)The student will investigate and gain sensory images of various aspects of the "Living Things" strand which will be further developed in subsequent grades.

GRADE I

a)The student will differentiate between living things as either plants or animals on the basis of their special characteristics.

b)The student will recognize and understand that living things reproduce their own kind.

c)The student will identify and classify different kinds of animals on the basis of locomotion.

d)The student will observe and discuss the basic survival needs of all animals (including humans).

e)The student will observe, investigate, and describe the growth and parts of common green plants.

f)The student will be guided to a basic understanding of the interdependence of plants and animals.

GRADE II

a)The student will observe, investigate, and describe the characteristics of animals.

b)The student will classify animals (including humans) according to their similarities and/or differences.

c)The student will observe and describe how animals (including humans) depend on other living things for food.

GRADE III

a)The student will observe and anlyze the adaptations of plants and animals (including humans) that have enabled them to survive in their environments.

b)The student will hypothesize adaptions of animals (including man) to survive in our changing environments.

c)The student will observe and investigate that living things are interdependent with one another and with their environment.

GRADE IV

a)The student will observe and identify insects according to their characteristics.

b)The student will observe, investigate, and classify insects according to their life cycles.

c)The student will discover and identify factors involved in the survival of insects in their environment.

F) LIVING THINGS

d)The student will match functions and names of flower parts.

e)The student will discuss critically the various methods of pollination in plants.

f)The student will investigate the composition of a seed and the two (2) basic seed types.

GRADE V

a)The student will investigate, identify and describe the necessary components and derived products in the process of photosynthesis, the basis of the world's food supply.

b)The student will investigate and classify plants according to observable and scientific characteristics.

GRADE VI

a)The student will investigate and discuss the formation and continuation of life as per the geological calendar (eras, evolution, genetics).

b)The student will investigate and classify animals according to observable and scientific characteristics.

c)The student will investigate and describe the behavior of plants and animals (tropism, instincts, etc.).

d)The student will investigate and describe the characteristics and functions of plant and animal cells.

EXPERIENCES RELATING TO THE WAPPINGERS CENTRAL SCHOOL DISTRICT'S SCOPE AND SEQUENCE

(See New York State Guides - "Science for Children K-3 and 4-6")

Wappingers Central School District's Science Program	New York State Guides - "Science for Children"
KINDERGARTEN	Total Kindergarten Scope of State guide
GRADE ONE	
Properties of Air	Grade 1 and Grade 2 - "Air, Water, and Weather"
Balanced Diet and Growth	Grade 1 - "Our Growing Bodies"
Relationship of Sun, Moon, and Earth	Grade 1 - "The Solar System and Beyond"
Animals (Basic needs and movement)	Grade 1 - "Living Things"
Growth and Parts of Plants	Grade 2 - "Living Things"
GRADE TWO	
Solids, Liquids and Gases	Grade 3 - "Matter and Energy"
Magnetism	Grade 3 - "Matter and Energy"
Nature of Water	Grade 2 - "Air, Water and Weather"
Types of Soil	Grades 1 and 2 - "The Earth and Its Composition"
Dental Health	Grade 2 - "Our Growing Bodies"
Revolution and Rotation	Grade 2 - "The Solar System and Beyond"
Animals (Classification, Characteristics and Obtaining Food)	Grades 1 and 2 - "Living Things"

Wappingers Central School District's Science Program	New York State Guides - "Science for Children"
GRADE THREE	
Earth (Composition and Change)	Grades 3 and 4 - "The Earth and Its Composition"
Introduction to the Solar System and Constellations	Grade 3 - "The Solar System and Beyond"
Interdependence of Living Things and Adaptation to Environment	Grade 3 - "Living Things"
GRADE FOUR	
Simple Machines	Grade 4 -"Matter and Energy"
Weather	Grades 3, 4, 5, and 6 - "Air, Water and Weather"
Digestive System	Grade 4 - "Our Growing Bodies"
Parts of Flowers and Seeds	Grade 4 - "Living Things"
GRADE FIVE	
Electricity	Grade 5 - "Matter and Energy"
Formation and Forces of the Earth	Grades 4 and 5 - "The Earth and Its Composition"
Solar System	Grade 4 - "The Solar System and Beyond"
Classification of Plants	Grade 6 - "Living Things"
GRADE SIX	
Changes in Matter	Grade 6 - "Matter and Energy"
Minera'	Grade 6 - "The Earth and Its Composition"
Beyond The Solar System	Grade 5 - "The Solar System and Beyond"
Classification of Animals	Grade 6 - "Living Things"
Plant and Animal Cells	Grade 5 - "Living Things"